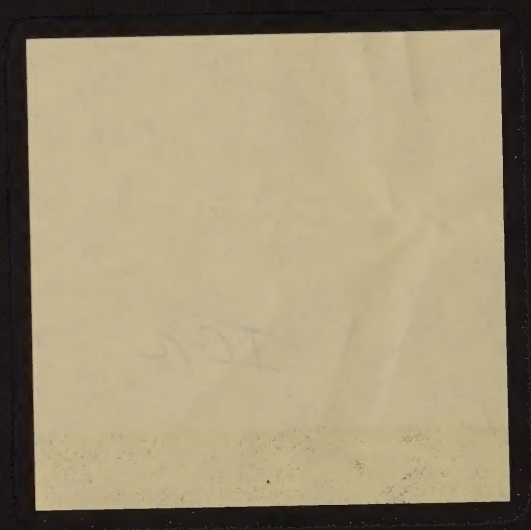


IC-10



Applicable model		TS-440S		Parameter	Format	Parameter function
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Description	Output commands		Input commands		Function	
	Answer command	Read command	Set command	Function		
				Function		
				Function		
Answer command		Read command		Set command		
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**SP SPLIT**

Description	Output commands	Input commands		Function																																																																																																																																																																																																																	
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Applicable models	TS-440S	Parameter	P1	Format	1	Parameter function	SPLIT ON/OFF
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








**VR** VOICE RECALL**VR** VOICE RECALL

Applicable models	TS-440S	Parameter	Format	Parameter function
Function	Generation of synthesized voice.			
Set command	<div> <div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div>V R ;</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> </div>			
Input commands	<div> <div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div>/</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> </div>			
Output commands	<div> <div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div>/</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> <div>27 28 29 30 31 32 33 34 35 36 37 38 39</div> </div>			
Description				

RX

TX

RX/TX

Applicable models		TS-440S		Parameter	Format	Parameter function																																																																														
Function																																																																																				
RX: For receive operation TX: For transmit operation																																																																																				
Input commands																																																																																				
Read command		<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr><tr><td colspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>					1	2	3	4	5	6	7	8	9	10	11	12	13														14	15	16	17	18	19	20	21	22	23	24	25	26																																							
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Answer command		<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr><tr><td colspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>					1	2	3	4	5	6	7	8	9	10	11	12	13														14	15	16	17	18	19	20	21	22	23	24	25	26														27	28	29	30	31	32	33	34	35	36	37	38	39													
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Description		After the TX command is executed, the receiving mode cannot be resumed by the SEND switch, etc. on the transceiver. (This condition is reset by turning the power off.) Unless the receiving mode is resumed by the RX command, operation of the SEND switch on the transceiver cannot be performed. Special attention should be paid, when this command is executed at frequencies which do not have actual power, the ON AIR LED is not lit. When "7," is replied to the TX command, the TX command is ignored, however, it is recommended to use the TX command in combination with the RX command if possible.																																																																																		

SC SCAN

SC SCAN

Applicable models		TS-440S		Parameter		Format		Parameter function																																																													
Function		Scan ON/OFF setting												P1		1		SCAN ON/OFF																																																			
Input commands	Set command	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr><tr><td>S</td><td>C</td><td>P1</td><td>:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>												1	2	3	4	5	6	7	8	9	10	11	12	13	S	C	P1	:										14	15	16	17	18	19	20	21	22	23	24	25	26																	
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	Read command	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr><tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>												1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26																														
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Output commands	Answer command	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr><tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr><tr><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td></tr></table>												1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39																	
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Description																																																																					



RIT DOWN/RIT UP

Applicable models		TS-440S		Parameter	Format	Parameter function																																																																	
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Set command																																																																							
Read command																																																																							
Output commands																																																																							
Answer command																																																																							
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When this command is used, the actual RIT frequency becomes different from that indicated by the knob position. When the knob is rotated again, the RIT frequency corresponding to the knob position resumes.



**MW****MEMORY WRITE**

Applicable models		TS-440S		Parameter	Format	Parameter function		
Function	Memory entry					P1	9	SPLIT SPECIFICATION
						P2	-	
						P3	7	MEMORY CHANNEL
						P4	4	FREQUENCY
						P5	2	MODE
Input commands	Set command					P6	9	MEMORY LOCKOUT
Input commands	Read command					P7	-	
Output commands	Answer command					P8	-	
Description						P9	-	

(1) The MW command is valid when all parameters have been correctly entered.
(2) When all effective frequency columns are "0", the memory is set to an open channel.
(3) When the split channel is open, the transceiver will be set for the same transmit and receive frequencies, i.e. simplex.

- (1) The MW command is valid when all parameters have been correctly entered.
- (2) When all effective frequency columns are "0", the memory is set to an open channel.
- (3) When the split channel is open, the transceiver will be set for the same transmit and receive frequencies, i.e. simplex.

# RC RIT CLEAR

Applicable models		TS-440S													Parameter	Format	Parameter function										
Function	RIT frequency clearance																										
Input commands	Set command	1	2	3	4	5	6	7	8	9	10	11	12	13													
		R	C	:																							
		14	15	16	17	18	19	20	21	22	23	24	25	26													
Input commands	Read command	1	2	3	4	5	6	7	8	9	10	11	12	13													
		14	15	16	17	18	19	20	21	22	23	24	25	26													
Output commands	Answer command	1	2	3	4	5	6	7	8	9	10	11	12	13													
		14	15	16	17	18	19	20	21	22	23	24	25	26													
Output commands	Answer command	27	28	29	30	31	32	33	34	35	36	37	38	39													

Description

When this command is used, the actual RIT frequency becomes different from that indicated by the knob position. When the knob is rotated again, the RIT frequency corresponding to the knob position resumes.



**MD**    **MODE**

Description	Output commands	Input commands		Function	Applicable models		TS-440S	Parameter	Format	Parameter function
		Read command	Set command	Mode setting	P1	2	MODE			
	Answer command									

Function	Applicable models	TS-440S	Parameter	Format	Parameter function
Memory display	<div> <div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> </div> </div>		P1	9	SPLIT SPECIFICATION
			P2	-	MEMORY BANK
			P3	7	MEMORY CHANNEL
			P4	4	FREQUENCY
			P5	2	MODE
			P6	10	MEMORY LOCKOUT
Input commands	Set command	<div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div> <div>M R P1 P2 P3</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> </div>	P7	-	
	Read command	<div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div> <div>M R P1 P2 P3</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> </div>	P8	-	
Output commands	Answer command	<div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div> <div>M R P1 P2 P3</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> <div> <div>27 28 29 30 31 32 33 34 35 36 37 38 39</div> </div> </div>	P9	-	
Description	(1) All parameters are set to OFF when the memory channel is vacant.				



Applicable models		TS-440S																Parameter	Format	Parameter function						
Function	Memory channel setting																		P1	-						
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Input commands	Set command																									
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Description																										



Applicable models		TS-440S		Parameter	Format	Parameter function																																																																											
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# IF INFORMATION

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FA

FB

FREQUENCY VFO A/FREQUENCY VFO B

Applicable models		TS-440S		Parameter	Format	Parameter function																																																																																											
VFO A and VFO B frequency selection and readout				P1	4	FREQUENCY																																																																																											
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# FN FUNCTION

Applicable models		TS-440S																Parameter	Format	Parameter function
Function		VFO A, VFO B and MEMORY setting																P1	3	FUNCTION
Description	Output commands	<div>Answer command</div> <div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div> <div>27 28 29 30 31 32 33 34 35 36 37 38 39</div>																		
	Input commands	<div>Set command</div> <div>1 2 3 4 5 6 7 8 9 10 11 12 13</div> <div>14 15 16 17 18 19 20 21 22 23 24 25 26</div>																		



# AI AUTO INFORMATION

Applicable models		TS-440S																																																																																																										
Function		Parameter	Format	Parameter function																																																																																																								
AUTO INFORMATION ON/OFF setting		P1	1	AI ON/OFF																																																																																																								
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	Answer command																																																																																																											
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(1) The "Auto Information" function checks the condition of the set once approximately every 1.5 seconds and when a change is detected automatically sends the IF command.

(2) The check time is longer than 1.5 seconds during scanning or TUNING dial rotation.

Applicable models		TS-440S													Parameter	Format	Parameter function
Function	Same function as microphone UP/DOWN switch																
Input commands	Set command	1	2	3	4	5	6	7	8	9	10	11	12	13	<div><div>DN</div><div>UP</div></div>		
		14	15	16	17	18	19	20	21	22	23	24	25	26			
Input commands	Read command	1	2	3	4	5	6	7	8	9	10	11	12	13	<div><div>DN</div><div>UP</div></div>		
		14	15	16	17	18	19	20	21	22	23	24	25	26			
Output commands	Answer command	1	2	3	4	5	6	7	8	9	10	11	12	13	<div><div>DN</div><div>UP</div></div>		
		14	15	16	17	18	19	20	21	22	23	24	25	26			
Output commands	Answer command	27	28	29	30	31	32	33	34	35	36	37	38	39	<div><div>DN</div><div>UP</div></div>		
Description																	



### 5-3-7. Command Use Precautions

1. When control characters (00 to IFH) have been included in the receive data, string the command following these control characters may not be correctly received and/or executed. Do not use these control characters.
2. Program execution may be delayed during encoder rotation.

### 5-3-8. Command list

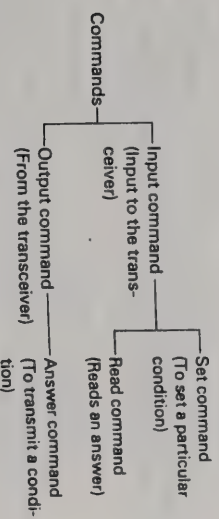
Command	Function	Page
AI	AUTO INFORMATION	13
DN/UP	DOWN/UP	14
FA/FB	FREQUENCY VFO A/ FREQUENCY VFO B	15
FN	FUNCTION	16
ID	ID	17
IF	INFORMATION	18
LK	LOCK	19
MC	MEMORY CHANNEL	20
MD	MODE	21
MR	MEMORY READ	22
MW	MEMORY WRITE	23
RC	RIT CLEAR	24
RD/RU	RIT DOWN/RIT UP	25
RT	RIT	26
RX/TX	RX/TX	27
SC	SCAN	28
SP	SPLIT	29
VR	VOICE RECALL	30
XT	XIT	31



### 5-3-3. Terminator

To signal the end of a command it is necessary to use a special character. The character that has been selected for use is the semi-colon ";". This special character must appear as the last character in a particular command string.

### 5-3-4. Types of commands



Commands can be classified as shown in the chart above.

For example, with the FA (Frequency of VFO A) command.

- To set the frequency at 7 MHz, the command sent from the computer to the transceiver is:  
"FA00007000000;" ..... (Set command)
- To read the frequency of VFO A, the command sent from the computer to the transceiver is:  
"FA;" ..... (Read command)

- When the read command, above, has been sent, the command returned to the computer is:  
"FA00007000000;" ..... (Answer command)

### 5-3-5. Error messages

In addition to the answer command, the transceiver will send one of the following error messages:

?	<ul style="list-style-type: none"><li>○ When the command syntax is incorrect.</li><li>○ When the command was not executed due to the current status of the transceiver, even though the command syntax was correct.</li></ul> <p><b>Note:</b> Occasionally this message may not appear due to microprocessor transients in the transceiver.</p>
E;	When a communication error occurs, such as an overrun error or framing error occurs during serial data transmissions.
O;	When the receive data is sent but processing cannot be completed.

5-3-b. How to read the command tables

Command	Name	The number of the command columns is shown	
AI	AUTO INFORMATION		
Applicable models for the command		Applicable models	TS-440S
Function of the command		Function	
The format of the command is shown. When oblique lines are drawn in the 1st and 2nd columns there is no set command.		Set command	
The format of the command for reading the sets condition is shown. When oblique lines are drawn in the 1st and 2nd columns, there is no read command.		Read command	
The format of the command output from the transceiver is shown. When oblique lines are drawn in the 1st and 2nd columns, there is no answer command.		Answer command	
Description		<div> <div>(1) The "Auto Information" function checks the condition of the set when a change is detected automatically sends the IF command</div> <div>(2) The check time is longer than 1.5 seconds during scanning or TUNING</div> </div>	

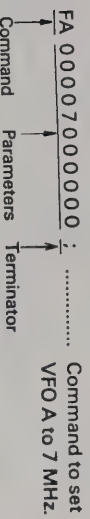
ent commands available for control of the transceiver.

These commands may be incorporated into a computer program written in BASIC or any other high level language such as PASCAL, etc. Programming methods vary from computer to computer so please refer to the instruction manuals included with your terminal program, and computer.

## 5-3. Commands

The illustration below demonstrates that a command is composed of two alphabetical characters, various parameters, and the terminator to signal the end of the command.

**Example:**



### 5-3-1. Command description

A command may consist of either lower or upper case alphabetical characters.

### 5-3-2. Parameter description (Refer to the parameter list.)

Parameters are used to specify specific information neces-

sary to implement the desired command. The exact number of parameters necessary for each command is predetermined. If a particular parameter is not applicable to the transceiver you are controlling the parameter digits should be filled using any character except the terminator " ; ".

For example the MC (Memory channel selector) command uses two parameters, 1 column to specify the memory bank number, and 2 columns to specify the memory channel number. To specify CH9 of memory bank number 1, the command would be:

"MC109;" .....

The memory bank number is not necessary when programming the TS-440S so the command could be as given above "MC109" or as:

"MC 09;" .....

In this case a blank has been used to fill the parameter block for the memory bank number.

The following are examples of bad commands:

"MC09;" .....

No memory bank specification (not enough parameters)

"MC19;" .....

Not enough digits in the memory channel parameter, i.e. CH9 should be given as "09".

"MC1109;" .....

Unnecessary characters between parameters.

"MC109" .....

No terminator

# Parameter list

Format No.	Name	Number of columns	Format
1	SW	1	0 = OFF 1 = ON 1 = LSB 4 = FM 2 = USB 5 = AM 3 = CW 6 = FSK
3	FUNCTION	1	0 = VFO A 2 = MEMORY 1 = VFO B
4	FREQUENCY	11	Represented in Hz, using 11 columns Example: 00007200000 is 7.2 MHz 10 GHz MHz kHz Hz The first column is "+" or "-", and the remaining four columns indicate the frequency in Hz. Example: +1050 is +1.05 kHz
5	RIT FREQUENCY	5	
6	—	—	
7	MEMORY CHANNEL	2	Represented in two columns Example: 02 is CH2
8	—	—	
9	MEMORY CHANNEL SPLIT SPECIFICATION	1	0 = Receive 1 = Transmit

Format No.	Name	Number of columns	Format
10	MEMORY LOCKOUT	1	0 = Not locked out 1 = Locked out
11	TX/RX	1	0 = Receive 1 = Transmit
12	—	—	
13	—	—	
14	—	—	
15	—	—	
16	MODEL NO.	3	Three column number specifying each set

## 3. SPECIFICATIONS

### 3-1. Interface

- Communication method .... Serial interface, full-duplex
- Transfer rate ..... 4800 BPS (bits per second)
- Synchronization ..... Start-stop (Asynchronous)
- Bit construction ..... 1 start bit, 8 character bits, 2 stop bits
- Parity ..... None
- Signal format ..... TTL level

### 3-2. Terminal connections

Pin No.	Signal Name		I/O
1	GND	Signal ground	
2	$\overline{\text{TXD}}$	Transmit data	Output
3	$\overline{\text{RXD}}$	Receive data	Input
4	CTS	Transmit enable	Input
5	RTS	Receive enable	Output
6	NC		

GND:

This is the signal ground terminal.

$\overline{\text{TXD}}$ :

The transmit data is the serial data from the transceiver to the computer. The output utilizes negative logic.

$\overline{\text{RXD}}$ :

The receive data is the serial data from the computer to the transceiver. The input utilizes negative logic.

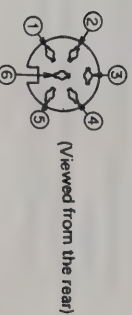
CTS:

This signal is supplied from the computer, and is used to inhibit transmit data from the transceiver when the computer is not ready to receive. The input utilizes positive logic. (Transmit data is stopped by a logic low.)

RTS:

This signal is applied to the computer, and is used to inhibit transmit data from the computer when the transceiver is not ready to receive it. The output utilizes positive logic. (Inhibit is requested when the level is low.)

Connector pin configuration



## 4. INSTALLATION

Refer to TS-440S instruction manual.

## 5. OPERATION

### **Caution:**

Turn the POWER switch OFF before making connections.

### 5-1. Precautions for Computer-Connected Operation

When connecting the transceiver with a computer, check the following points.

1. Are the connections correct?

The transceiver output should be connected to the computer input and the transceiver input to the computer output.

#### **Example:**

Transceiver's receive data — Computer's receive data  
Transceiver's RTS — Computer's CTS

2. Is the computer's transmission rate 4800 BPS (bits per second)?
3. Is the computer's bit configuration correct?  
1 start bit, 8 character bits, 2 stop bits, no parity.

### 5-2. Control Operation

Most computers handle data in the form of "bits", and "bytes". A bit is the smallest piece of information that the computer can handle. A byte is composed of 8 bits. This is the most convenient form for most computer data. This

data may be sent in the form of either serial or parallel data strings. The parallel mode is faster, but more complicated, while the serial form is slower it requires less complicated equipment, and therefore is less expensive.

Serial transmission of data occurs over a single line using time-division methods. This use of a single line also offers the advantage of reducing the number of errors due to line noise.

For control of the transceiver via the computer only three lines are theoretically required: transmit data (TXD), receive data (RXD), and ground (GND). From a practical standpoint it is also necessary to incorporate some means of controlling when this data transfer will occur. The transceiver has the buffer for reception and the computer may have also that. Then the RTS and the CTS lines will control each data transfer never overflow those buffers.

The IF-232C is used in conjunction to provide voltage conversion. RS-232C deals in voltages above and below TTL levels, and must be converted to prevent damage to the transceiver. This interface/conversion is handled by the IF-232C.

The actual command sequence would be similar to those described below:

For example, the radio is placed into the transmit mode whenever the character string "TX" is sent from the computer. The character string "TX" is called a command. It tells the transceiver to do something. There are 23 differ-



# CONTENTS

Thank you for purchasing the new IC-10 IC kit. Please read this instruction manual carefully before placing your IC kit in service. This unit has been carefully engineered and manufactured to rigid quality standard, and should give you satisfactory and dependable operation for many years.

The IC-10 IC kit is designed to be installed internally in transceiver the TS-440S, to allow computer assisted control of various transceiver operating parameters. Control is performed via the computers RS-232C terminal via the IF-232C interface (level translator).

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## 1. FEATURES

1. A wide variety of control instructions are possible.
2. Powerful, easy-to-understand instruction set.
3. Common commands that are interchangeable between different transceivers, reducing the number of changes necessary in software development.
4. Simultaneous operation of personal computer and transceiver.

## 2. SUPPLIED ACCESSORIES

The following accessories are supplied this kit. Confirm that all are present.

1. IC ..... ( $\mu$ PD8251AFC)..... 1 ea.
2. IC ..... (TC4040BP)..... 1 ea.
3. Instruction manual..... (B50-8081-10)..... 1 ea.

### Note:

The TS-440S does not include computer software, guidelines are provided but due to the wide variety of computers available, all of which have their own languages it is left up to the owner to design his or her own software package.

IC KIT

# IC-10

---

## INSTRUCTION MANUAL

KENWOOD CORPORATION

# KENWOOD

©PRINTED IN JAPAN B50-8081-10(K,M)(G)  
87/6 5 4 3 2 1 86/12 11 10 9 8 7

2000

11.11.2000

# COMMAND DESCRIPTION FOR KENWOOD COMPUTER INTERFACE

## Auto Information

AI;

The Radio Will Sent the Status Info Automatically  
Whenever the Operator Manually Varies any Function  
on the Radio which is Covered in the IF; Command  
Where n = 0 for Auto Info OFF  
1 for Auto Info ON

The Status Information Will be Sent in the Form :  
As defined in the IF; Command

## Display Memory

DMnnnn;

This is a Factory Diagnostic Function  
and is of no practical use to the operator

The Contents of the MPU Memory will be Read  
Where nnnn = MPU Address (0000 thru FFFF (HEX))

The Contents of the MPU Memory Will be Sent in the Form:  
DMnnnn-aabbccddeeffgghhiijjkk;  
Where nnn = MPU Address (0000 thru FFFF (HEX))  
aa-kk = Hex Number Pairs of Next 16 Locations

## Down

DN;

The Frequency or Memory Channel  
Will Decrement One Step

## Frequency VFO A / VFO B Request

FA;

FB;

The Frequency in the Selected VFO Will be Read

The Frequency Will be Sent in the Form:  
FAGggmmmmkkkhhh; or  
FBggmmmmkkkhhh;  
Where gg = GHz. Value  
mmm = MHz. Value  
kkk = KHz. Value  
hhh = Hz. Value

## Frequency VFO A / VFO B Select

FAGggmmmmkkkhhh;

FBggmmmmkkkhhh;

The VFO Selected Will be Set to the Frequency Defined  
Where gg = GHz. Value (May be sent As 00 or Spaces)  
mmm = MHz. Value  
kkk = KHz. Value  
hhh = Hz. Value





### Function Select

FNn;

The Function Defined Will be Selected

Where    n = 0 for VFO A  
          1 for VFO B  
          2 for MEMORY

### Identify Model Request

ID;

The Model of the Radio Will be Sent in the Form:

ID00n;

Where    n = 1 for a TS-940  
          2 for a TS-811  
          3 for a TS-711  
          4 for a TS-440

### Read Information Request

IF;

The Status Information Will be Sent in the Form:

IFggmmmmkkkhhh    snnnrxrxytdfcp

Where    ggmmmmkkkhhh = Value as Defined in FA Command  
                         s = "+" or "-" Value of RIT/XIT  
                         nnn = Value of RIT/XIT (n.nn khz.)  
                         z = "0" (Not Used in TS-440)  
                         r = Value as Defined in RT Command  
                         x = Value as Defined in XT Command  
                         yy = Memory Channel No.  
                         t = 0 for Receive  
                                 1 for Transmit  
                         d = Value as Defined in MD Command  
                         f = Value as Defined in FN Command  
                         c = Value as Defined in SC Command  
                         p = Value as Defined in SP Command

### Lock Knob

LKn;

The Manual Frequency Control Functions Will be Disabled

Where    n = 0 for Lock OFF  
          1 for Lock ON

### Memory Channel Select

MCxmm;

The Memory Channel Defined Will be Selected

Where    x = Don't Care    (Use "0" or Space)  
          mm = Memory Channel No. (00 thru 99)

### Mode Select

MDn;

The Mode Defined Will Be Selected

Where    n = 1 for LSB  
          2 for USB  
          3 for CW  
          4 for FM  
          5 for AM  
          6 for FSK



### Memory Read

MRnxrr;

The Memory Channel Defined Will be Read

Where        n = 0 for RX VFO  
              1 for TX VFO    (Split Channels Only)  
              x = Don't Care    (Use "0" or Space)  
              rr = Memory Channel No.    (00 thru 99)

The Memory Information will be sent in the Form:

MRn rrgmmmkkkhhhdz;

Where        n = 0 for RX VFO  
              1 for TX VFO    (Split Channels Only)  
              rr = Memory Channel No.    (00 thru 99)  
              ggmmmkkkhhh = Value as Defined in FA Command  
              d = Value as Defined in MD Command  
              z = "0"            (Not Used in TS-440)

Note: (Four trailing Spaces)

### Memory Write

MWnxrrggmmmkkkhhhdzxxxx;

The Memory Selected Will be Set to the Frequency Defined

Where        n = 0 for RX VFO  
              1 for TX VFO    (Split Channels Only)  
              x = Don't Care    (Use "0" or Space)  
              rr = Memory Channel No.    (00 thru 99)  
              ggmmmkkkhhh = Value as Defined in FA Command  
              d = Value as Defined in MD Command  
              z = "0"            (Not Used in TS-440)

### RIT/XIT Clear

RC;

The RIT/XIT will be set to 0.00 KHz.

### RIT/XIT Down

RD;

The RIT/XIT will Decrement by 0.01 KHz. (10 Hz.)

### RIT Enable/Disable

RTn;

The RIT will be Set On or Off

Where        n = 0 for Off  
              1 for On

### RIT/XIT Up

RU;

The RIT/XIT will increment by 0.01 KHz. (10 Hz.)

### Receive Operation

RX;

Enter Receive Mode

The Security Council has decided that the  
 a - 1000 000  
 1 - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)

The Security Council has decided that the  
 a - 1000 000  
 1 - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)

The Security Council has decided that the  
 a - 1000 000  
 1 - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)  
 a - 1000 000 (Copy to Security Council)

The Security Council has decided that the

The Security Council has decided that the

The Security Council has decided that the

The Security Council has decided that the

The Security Council has decided that the

SCn;  
Scan  
Scan Control  
Where n = 0 for Scan Off  
1 for Scan ON

SPn;  
Split  
Split Control  
Where n = 0 for Split Off  
1 for Split ON

Transmit Operation  
TX;  
Enter Transmit Mode

Up  
UP;  
The Frequency or Memory Channel  
Will Increment One Step

Voice Recall  
VR;  
Generation of Synthesized Voice

XIT Enable/Disable  
XTn;  
The XIT Will be Set On or Off  
Where n = 0 for XIT Off  
1 for XIT On



Page 1  
Date 1/1/1918  
To the Hon. Sec. of War  
Washington, D. C.

My dear Sir,  
I have the honor to acknowledge  
the receipt of your letter of  
the 28th inst. regarding the  
subject of the proposed  
amendment to the  
National Defense Act of 1916.

I am, Sir, very respectfully,  
Yours very truly,  
John D. Ryan

Director, Bureau of War Reliefs

The Bureau of War Reliefs  
has the honor to acknowledge  
the receipt of your letter of  
the 28th inst. regarding the  
subject of the proposed  
amendment to the  
National Defense Act of 1916.

Very respectfully,  
John D. Ryan

Director, Bureau of War Reliefs

Enclosed for the Bureau of War Reliefs  
are two copies of the proposed  
amendment to the National Defense Act of 1916.

The Bureau of War Reliefs  
has the honor to acknowledge  
the receipt of your letter of  
the 28th inst. regarding the  
subject of the proposed  
amendment to the  
National Defense Act of 1916.